

TSI-5320 SONET/SDH OPTICAL TEST SYSTEM

FEATURES

- Generate and analyze different simultaneous patterns on OC-192/STM-64 and OC-48/STM-16
For OC-192/STM-64: Any combinations of STS-192c/STS-48c/STS-12c/STS-3c/STS-1c or any combinations of STM-64c/STM-16c/STM-4c/STM-1c.
For OC-48/STM-16: Any combinations of STS-48c/STS-12c/STS-3c/STS-1c or any combinations of STM-16c/STM-4c/STM-1c
- Full overhead access and analysis including detection of change in overhead bytes by a Receiver Card.
- Error insertion of B1, B2, B3, pattern and random by the Transmitter Cards.
- Error detection of B1, B2, B3, pattern and framing by the Receiver Cards.
- Internal reference oscillator, external DS-1, or E1 or any receiver slot for reference timing
- THRU Mode for distributing a STS-48/STM-16 received signal.
- Control and readout of Path and Transport Overhead
- DCC drop and insert for line and section.
- Software stored on the CPU/Clock Card in flash permitting easy upgrading of a test system.
- Ethernet 10BaseT interface for control.
- Java graphical interface for full test and control.
- Up to fourteen simultaneous users supported per chassis.



BENEFITS

- Full range of BER testing of all concatenated and tributary signals
- High density testing for low cost per port
- Testing for North American and ITU protocols
- Highest throughput for carrier and manufacturing applications
- JAVA GUI supports multiple simultaneous users

OVERVIEW

The TSI-5320 SONET/SDH Optical Test System is a flexible optical test system created around plug-in cards. The TSI-5320 can be easily configured to provide testing for any valid combination of OC-192/STM-64 or OC-48/STM-16 tributaries.

The TSI-5320 is offered with the choice of a 15-slot rack-mounted shelf, 4-slot rack-mounted shelf and 4-slot portable chassis. The TSI-5320 shelves can be installed in 19" or 23" wide bays. Operating from -48VDC station battery power, the shelves support transmitter and receiver cards which work together over a high-speed communications backplane providing flexible OC-192/STM-64 and/or OC-48/STM-16 transmit and receive testing capabilities. One card slot is dedicated for the CPU/Clock Card, which provides test control, software storage, timing and diagnostics for all other cards within the shelf.

The shelf backplane provides a time division multiplexed (TDM) parallel data bus used to route STS-48, STM-16 or any STS-48/STM-16 in an OC-192/STM-64 traffic between cards in the shelf. The backplane provides simultaneous transport for two separate STM-48/STS-16 channels allowing for receive, modify and re-transmit capability. Timing is provided by the CPU/Clock Card, which can lock the transmit timing throughput to any of several possible clock sources such as external T1 or E1 Bits, internal clock or any installed Receiver Card can be individually enabled. The nature of the TDM parallel back-plane provides the ability for any card to drop or insert tributary traffic in any of the STS-48/STM-16 time slots. The smallest back-plane granularity is STS-1 for SONET and STM-1 for SDH.

TSI-5320-1 FIFTEEN-SLOT SHELF

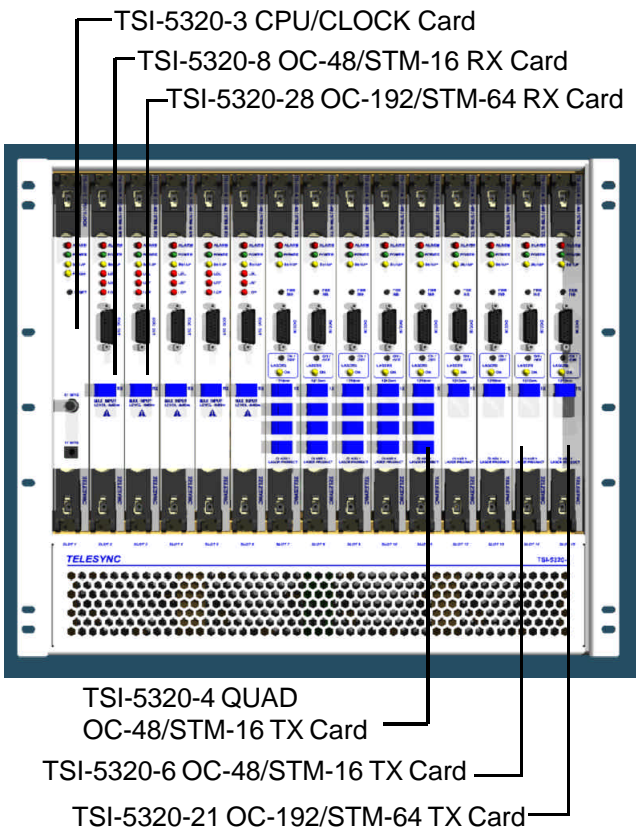
There are 15 card slots in the 15.73"H x 11.97"D x 17"W TSI-5320-1 Shelf. The shelf can be mounted in a 19" rack or optionally a 23" rack. The left card slot is for the TSI-5320-3 CPU/Clock Card. The remaining 14 slots are available for line cards. The CPU/Clock Card provides a 10Base-T Ethernet connection port for user interaction and control. The Ethernet connection is accessible on the shelf's rear panel. Control of the TSI-5320 system is achieved through the Ethernet port by a Java windowing program. An RS-232C interface is provided for setting the IP address.

Line Cards are either Transmitters (TX) or Receivers (RX). Any RX Card can be enabled to drive any TDM time slot on the back plane. TX Cards accept STS-48/STM-16 data from the back-plane bus and can select portions or up to all of the STS-48/STM-16 traffic for synthesis. All optical connections are made on the front panels of transmitter and receiver cards.

The TSI-5320-1 shelf provides cooling for the installed cards with fans incorporated in the lower portion of the shelf. The shelf's air intake is located on the lower front and the hot exhaust air blows out of vent holes distributed across the top surface. Multiple shelves can be stacked directly one upon another when mounting in equipment bays since the exhaust airway for a lower shelf is provided as part of the upper shelf.

Cards can be inserted or removed without concern due to hot-insertion/removal circuitry on each card. Removal of the CPU/Clock Card turns off all remaining cards in the shelf including the cooling fans. When a card is inserted into a powered shelf, the CPU/Clock Card recognizes its presence and automatically initializes it for service.

A conditioned dry contact alarm relay is included on the CPU/Clock Card as an alternate indication of alarm status. A terminal block located on the rear panel of the shelf provides a connection point for interfacing to the alarm relay.



TSI-5320-1 Shelf Rear Panel

TSI-5320-2 FOUR-SLOT SHELF

The TSI-5320-2 Four Slot Shelf measures 5.25"H x 11.97"D x 17"W. The shelf accepts the same cards as the 15-slot shelf. The shelf can be mounted in a 19" rack or optionally, a 23" rack. The circuit cards plug horizontally into the TSI-5320-2 Shelf. The CPU/Clock Card occupies the bottom card slot leaving 3 slots available for line cards. The electrical specifications are the same as the TSI-5320-1 Shelf except the cooling fans are located on the side.



TSI-5320-2P FOUR-SLOT PORTABLE CHASSIS

The TSI-5320-2P Four-Slot Portable Chassis measures 5.6"H x 14"D x 18"W. The chassis is the same as the 4-slot shelf except, instead of a rack adapter kit, it contains a 110Vac to -48Vdc power supply, carrying handle and feet.



TSI-5320-3 CPU/CLOCK CARD

10Base-T Ethernet on back plane (RJ-45 connector on rear of shelf).
RS-232C interface (DB-9 female connector on rear of shelf).
FLASH - 64MB virtual hard disk storage of firmware for all cards.
SRAM - Processor software runs from SRAM memory.
RTC - Real Time Clock for BERTS functions.
NOVRAM for IP address, Ethernet address and configuration settings storage for all test cards.
HDLC control interface to back-plane for talking to test cards.
Local power supply for logic voltages backplane buss and cooling fans.
T1 BITS clock input consisting of 100 ohm Bantam connector for T1 BITS timing.
E1 BITS clock input consisting of 75 ohm BNC connector for E1 BITS timing.
Local +/-2ppm TCXO for internally generated timing reference.
PLL and associated circuitry for creating 38.88MHz back-plane timing.
Front Panel LEDs to indicate DC power, Alarming and control.
Software can be updated in the field using FTP protocol.

TSI-5320-21 OC-192/STM-64 TX CARD

Transmitter laser:

Optical Wavelength 1550nm (ITU-T Wavelength nm 1530.33 to 1562.23 in 100 GHz spacing available)

Optical Power Level +1 to +3 dBm (IR)

Connector Type SC

Transmits internally generated patterns and/or any portion of STS-48/STM-16 back-plane data.

Introduce B1 (Section), B2 (Line), B3 (Path) and pattern errors - single or continuous at inserted error rates of 1×10^{-3} to 1×10^{-12} .

Front panel B1 error insert button.

Patterns for OC-192c or STM-64c Output

PRBS15, 23, 31 normal or inverted, all 1s, all 0s

Patterns for OC-192 or STM-64 for any simultaneous combination of STS-48c/STS-12c/STS-3c/STS-1c or STM-16c/STM-4c/STM-1c.

PRBS15, 20,23 normal or inverted, all 1s, all 0s

Path overhead trace buffer for each tributary SPE can be uniquely defined.

Can insert either section DCC (192 kbytes) and/or line DCC (576 kbytes) channels from front panel connector (RS-422/DB-15 or TTL/CMOS) or software controlled.

Front panel laser output on/off button.

Compliant with Bellcore G-253 CORE and ITU G957.

User can define all SONET/SDH transport overhead bytes via software control.

Local -48V power supply with front panel LED indicator.

HDLC control interface for communications with CPU/Clock Card.

TSI-5320-28 OC-192/STM-64 RX CARD

Receives 1550nm or 1310nm.

Connector Type SC

Sensitivity is 0 to -18dBm.

Maximum receive power +4dBm.

Transfer any of the received OC-48/STM-16 optical input signals onto back plane.

Detects and monitors B1, B2, B3, Pattern and framing errors.

Patterns for OC-192c or STM-64c Output

PRBS15, 23, 31 normal or inverted, all 1s, all 0s

Patterns for OC-192 or STM-64 for any simultaneous combination of STS-48c/STS-12c/STS-3c/STS-1c or STM-16c/STM-4c/STM-1c.

PRBS15, 20,23 normal or inverted, all 1s, all 0s

Analyze any two OC-48/STM-16 and its tributaries

With the optional OC-192/STM-64 RX Tributary Card analyze any combinations simultaneously OC-192c/STS-48c/STS-12c/STS-3c/STS-1c or STM-64c/STM-16c/STM-3c/STM-1c.

Can drop either section DCC channel to front panel connector (RS-422 or TTL/CMS) or software controlled.

Display all Transport Overhead bytes via software.

Monitor and display value change of any or all transport overhead bytes.

Can supply receive reference timing for transmit timing.

Monitors pointer activities on OC-192/STM-64/OC-48/STM-16 and all tributaries.

Loss of Light LED.

Local -48V power supply with front panel LED indicator.

HDLC control interface for communications with CPU/Clock Card.

Measure optical receive power and display in dBm.

TSI-5320-4 OC-48/STM-16 TX CARD

Transmitter laser:

Optical Wavelength 1310nm

Optical Power Level +0 to -5 dBm (IR)

Connector Type SC

Transmits back-plane data or internally generated patterns.

Introduce B1 (Section), B2 (Line), B3 (Path) and pattern errors - single or continuous at inserted error rates of 1×10^{-3} to 1×10^{-12} .

Front panel B1 error insert button.

Generates PRBS 15, PRBS 20, or PRBS 23 normal or inverted, All 1s, All 0s and Alt 1-0 in OC-48/STM-16 with any simultaneous combinations of STS-48c/STS-12c/STS-3c/STS-1c or any simultaneous combinations of STM-16c/STM-4c/STM-1c.

Path overhead trace buffer for each tributary SPE can be uniquely defined.

Can insert either section DCC (192 kbytes) and/or line DCC (576 kbytes) channels from front panel connector (RS-422/DB-15 or TTL/CMOS) or software controlled.

Front panel laser output on/off button.

Compliant with Bellcore G-253 CORE and ITU G957.

User can define all SONET/SDH transport overhead bytes via software control.

Local -48V power supply with front panel LED indicator.

HDLC control interface for communications with CPU/Clock Card.

TSI-5320-6 QUAD OC-48/STM-16 TX CARD

Transmitter laser:

Optical Wavelength 1310nm

Optical Power Level +0 to -5 dBm (IR)

Connector Type SC

Four OC-48/STM-16 lasers distributing the same signal. Specifications are the same as TSI-5320-4 TX Card.

TSI-5320-8 OC-48/STM-16 RX CARD

Receives 1550nm or 1310nm.

Connector Type SC

Sensitivity is -9 to -28dBm.

Maximum receive power -5dBm.

Transfer any of the received optical input signals onto back plane.

Detects and monitors B1, B2 and B3, Pattern and framing errors.

BER test for PRBS 15, PRBS 20 and PRBS 23 normal and inverted, All 1s, All 0s and Alt1-0 in OC-48 with any simultaneous combinations of STS-48c/STS-12c/STS-3c/STS-1c or STM-16 and any simultaneous combinations of STM-16c/STM-4c/STM-1c.

Can drop either section DCC channel to front panel connector (RS-422 or TTL/CMS) or software controlled.

Display all Transport Overhead bytes via software.

Monitor and display value change of any or all transport overhead bytes.

Can supply receive reference timing for transmit timing.

Monitors pointer activities on OC-48/STM-16 and all tributaries.

Loss of Light LED.

Local -48V power supply with front panel LED indicator.

HDLC control interface for communications with CPU/Clock Card.

Measure optical receive power and display in dBm.

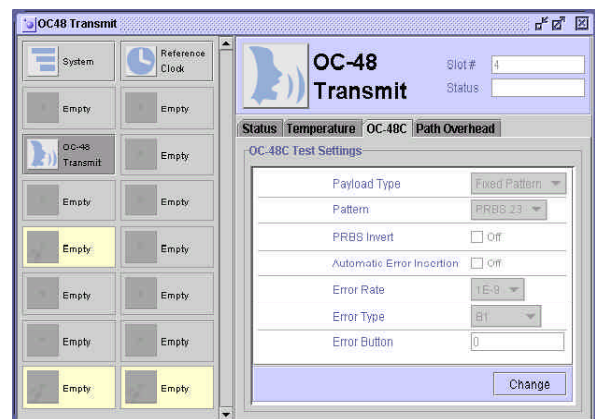
JAVA GRAPHICAL USER INTERFACE

The TSI-5320 is controlled using the supplied JAVA graphical user interface software. Full test set up, control and data gathering is easy using the intuitive controls contained in the screens.

The JAVA-based graphical user interface (GUI) software allows a single user to operate and control all of the cards individually. The software is used through a 10BaseT Ethernet interface to allow multiple users to simultaneously operate and control different cards in the test system.



Software symbols and color schemes detect and identify if a card is in an alarm condition or what card types are installed in the shelf. The left side of the control screen shows the configuration of installed cards. Selecting the appropriate card allows the user to change or modify that card's internal testing parameters or view the test results. The TSI-5320 can be remotely controlled using TCP/IP over Ethernet. The JAVA software is provided on a CD-ROM and included with the TSI-5320-3 CPU/Clock card.



TSI-5320 SONET/SDH Optical Test System

Ordering Information

TSI-5320-1 Fifteen-Slot Shelf

15 Slots, -48VDC, 19" Rack Mount

P/N 300131 23" Rack Mount Kit for TSI-5320-1

TSI-5320-2 Four-Slot Shelf

4 Slots, -48VDC, 19" Rack Mount

P/N300132 23" Rack Mount Kit for TSI-5320-2

TSI-5320-2P Four-Slot Portable Chassis

4 Slots, 110Vac/600 watts

P/N 400144 Carrying Case for TSI-5320-2P

TSI-5320-3 CPU/Clock Card

Includes Java Graphical User Interface Software,
85 Watts

TSI-5320-4 OC-48/STM-16 TX Card

1310 nm 0 to -5 dBm, 40 Watts

TSI-5320-6 Quad OC-48/STM-16 TX Card

1310 nm 0 to -5 dBm, 40 Watts

TSI-5320-8 OC-48/STM-16 RX Card

1310 or 1550 nm, -9 to -28 dBm, 50 Watts

TSI-5320-21 OC-192/STM-64 TX Card

1550 nm +1 to +3dBm, 80 Watts

TSI-5320-28 OC-192/STM-64 RX Card

1310 or 1550 nm, 0 to -18 dBm, 90 Watts

P/N 100544 OC-192/STM-64 RX Tributary Card

TELESYNC reserves the right to update the product specifications without notice.

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